
ALWAYS
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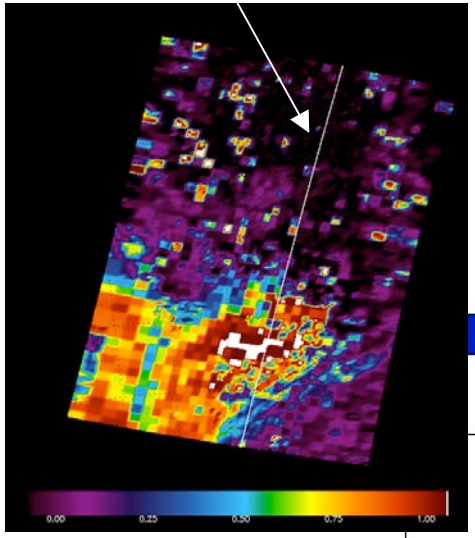
CLOUDSAT- AIRS CLOUD COMPARISON

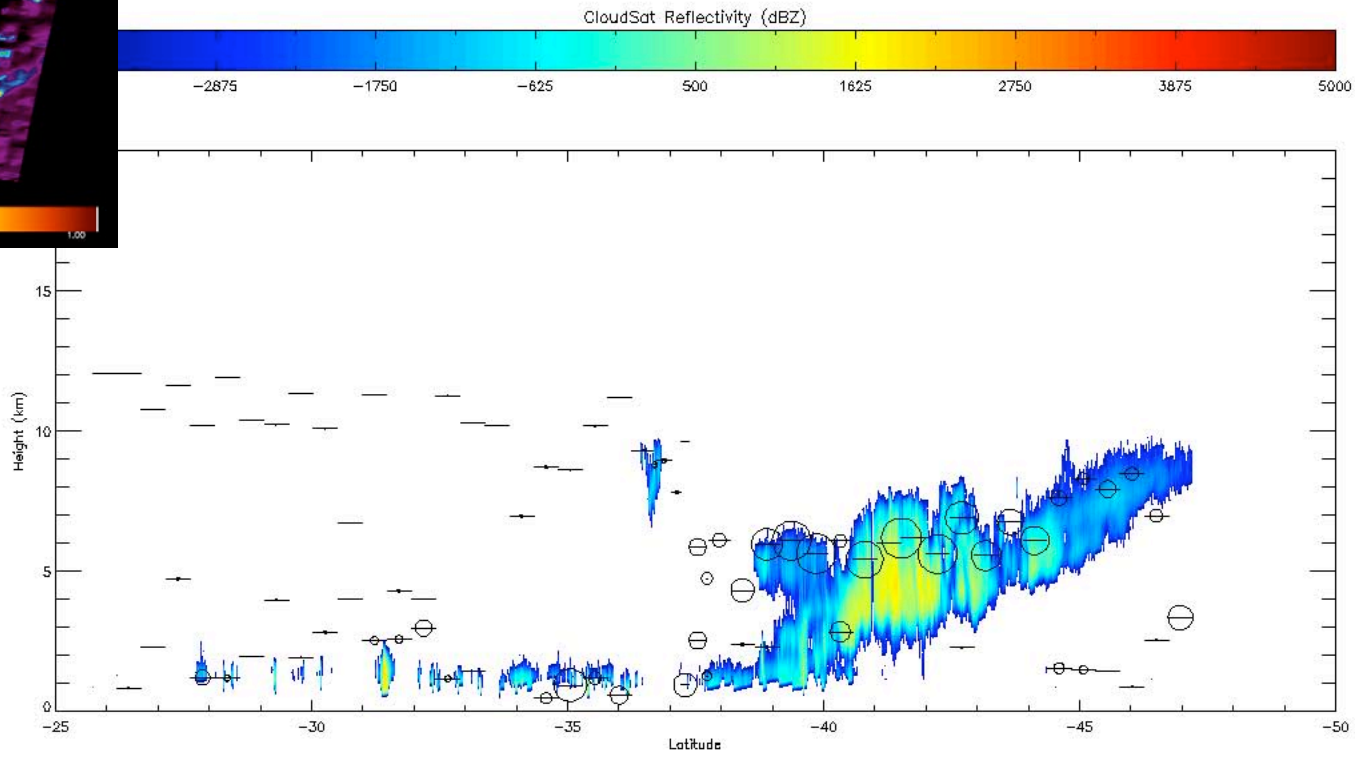
CloudSat Track



AIRS Cloud Height ——

AIRS Cloud Amount o ◯

Small Large



July 20, 2006

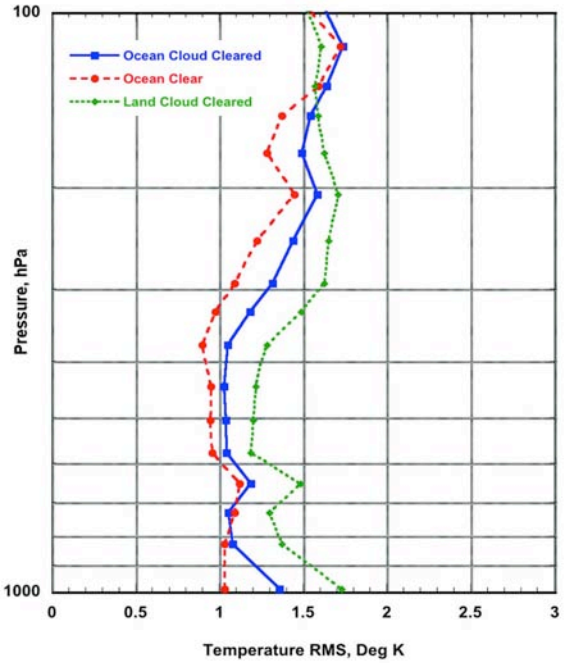
S. Atlantic

Upper left: Upper level AIRS cloud amount with coincident CloudSat track (brighter colors = more cloud). **Lower right**: Vertical cross-section of reflectivity for "confident clouds" using CloudSat cloud mask. Superimposed are the AIRS cloud heights and cloud amounts for both layers.

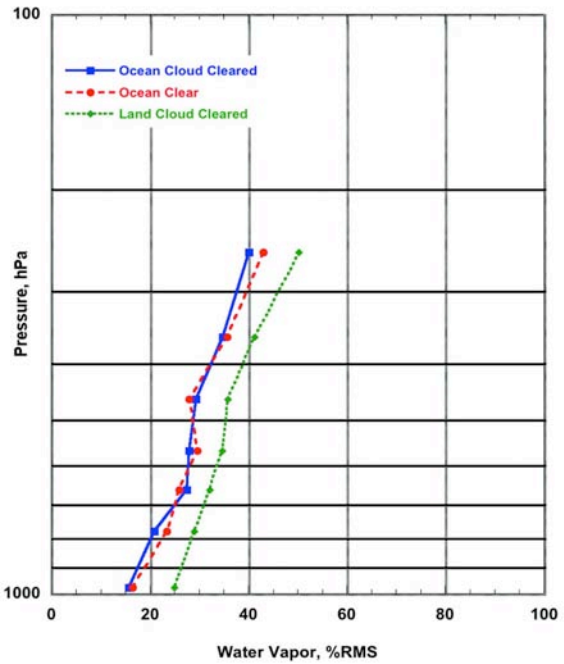
Credits: **B.H. Kahn**, M.T. Chahine, G.G. Mace , R. Marchand, G.L. Stephens and the CloudSat and AIRS Teams

Global Validation of AIRS Temperature and Water Vapor

Temperature Profiles



Water Vapor Profiles



AIRS Validation With Collocated Radiosondes

Cloud Cleared (n= 59,433) *vs.* Clearest (n=1000)

Pole to Pole - Day/Night - Sea/Land/Coastal

Murty Divakarla (NOAA) in JGR 2006

V.4 GLOBAL ERROR SOURCES in AIRS RETRIEVALS

$$(\text{Obs - Calc})^2_{RMS} = (\text{Clear Retieval})^2_{RMS} + (\text{Cloud Clearing})^2_{RMS} + (\text{Collocation})^2_{RMS} + (\text{Emissivity})^2_{RMS}$$

Data Sources:
D. Tobin (UWis) - JGR 2006
M. Divakarla (NOAA) – JGR 2006

TABLE 2. Components of the near-surface errors (K) in the retrieved temperature profiles. Numbers between parentheses are calculated and numbers without parentheses are carried over or are set equal to zero.

	Rms* error	Clear retrieval	Cloud clearing	Collocation	Emissivity
ARM TWP clearest	0.6	(0.6)	0	0	0
ARM TWP cloud cleared	1.0	0.6	(0.8)	0	0
ARM SGP cloud cleared	2.0	0.6	0.8	0	(1.7)
Global ocean clearest	1.0	0.6	0	(0.8)	0
Global ocean cloud cleared	1.4	0.6	(1.0)	0.8	0
Global land cloud cleared	1.7	0.6	1.0	0.8	(0.9)

* From retrieval validation results.

TABLE 3. Components of the near-surface percent errors in the retrieved precipitable water vapor profiles. Numbers between parentheses are calculated and numbers without parenthesis are carried over or are set equal to zero.

	RMS* error	Clear retrieval/ cloud clearing**	Collocation	Emissivity
ARM TWP clearest	10%	(10%)	0	0
ARM TWP cloud cleared	10%	10%	0	0
ARM SGP cloud cleared	25%	10%	0	(23%)
Global ocean clearest	17%	10%	(14%)	0
Global ocean cloud cleared	16%	10%	14%	0
Global land cloud cleared	25%	10%	14%	(18%)

From BAMS, July 2006

V.4 - ERROR SOURCES IN AIRS RETRIEVALS

$$(\text{Obs - Calc})^2_{RMS} = (\text{Clear Retieval})^2_{RMS} + (\text{Cloud Clearing})^2_{RMS} + (\text{Collocation})^2_{RMS} + (\text{Emissivity})^2_{RMS}$$

TABLE 2. Components of the near-surface errors (K) in the retrieved temperature profiles. Numbers between parentheses are calculated and numbers without parentheses are carried over or are set equal to zero.

	Rms* error	Clear retrieval	Cloud clearing	Collocation	Emissivity
ARM TWP clearest	0.6	**(0.6)**	0	0	0
ARM TWP cloud cleared	1.0	0.6	**(0.8)**	0	0
ARM SGP cloud cleared	2.0	0.6	0.8	0	**(1.7)**
Global ocean clearest	1.0	0.6	0	**(0.8)**	0
Global ocean cloud cleared	1.4	0.6	**(1.0)**	0.8	0
Global land cloud cleared	1.7	0.6	1.0	0.8	**(0.9)**

* From retrieval validation results.

Next, EMISSIVITY!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